CONFERENCE OF THE COMMITTEE ON DISARMAMENT

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The problem of defining compounds having military significance as irritating and incapacitating agents

Introduction

1. This paper is to be considered as a supplement to CCD/414 in that the same scheme of definition has been applied to those chemical substances that depend primarily on their irritating or incapacitating effect for their possible military utility.

Non-lethal Agents

2. Attention is drawn to the meaning of some of the terms used in this paper:

harassing or irritating means having a physiological effect which will render individuals incapable of normal concerted physical effort during exposure and only for a very short period of time (minutes) after exposure ceases. These are generally known as riot control agents;

incapacitating means having physiological or mental effects which will render individuals incapable of normal concerted physical or mental effort or both for a significant period of time after exposure. Such agents resemble riot control agents in that the effects are temporary and without permanent damage but are different in that the effect may last for hours or in extreme cases for days.

3. It is necessary to stress the difference in agents that cause the above effects: the first are those that are immediately and physically irritating (e.g. tear gas), and whose effects last only for a short period after exposure. The second type are those that are mentally or physically incapacitating for a significant period of time after exposure ceases. Because of the lack of perceptible signs of the presence of such agents, the effects of these agents may not be observed until after an incapacitating dose has assimilated.

4. Some agents generally categorized as harassing agents have a toxicity which would place them above the lower threshold of toxicity set out in Table I.[1/] The military

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1/ As in CCD/414 but amended.

utility of harassing and incapacitating agents is related, however, not to their possible lethal effects, but to their irritating and incapacitating effect. It remains to determine, therefore, a threshold of irritating or incapacitating effectiveness above which these chemical substances can be considered as having military utility.2/

5. Annex B of the Report of the Secretary-General of the United Nations on Chemical and Bacteriological Weapons (Document A/7575 or S/9292) tabulates the effectiveness of the irritating agents in terms of a tolerance limit. For the purpose of this paper, a different quantitative unit is used, the effective median dosage, in order to be consistent with the dosage used for lethal agents. The dosage of those that are known is shown in Table II. From this it can be seen that a threshold can be drawn at a value of about 200 mg.min/m^3 for the median dosage. Because those at present available are relatively cheap and simple to manufacture, the incentive to produce new non-lethal agents may not be great. It cannot be ruled out, however, that new agents might be discovered that would not be as efficient as those at present known. To allow for this, it is proposed to lower this threshold to a value of 500 mg.min/m^3, the same level as for the upper threshold of the lethal agents. Since all these agents are single purpose, this suggests that these substances could then be described as a class of "super effective" single purpose non-lethal agents. It is difficult to say whether this threshold value should be lowered even further. However, it is perhaps instructive to note that 80 proof whisky has an equivalent median incapacitating dosage of about 1,500 mg.min/m^3. Since alcohol is not an efficient weapon of war, it seems reasonable to state that the threshold for non-lethal agents is probably somewhere between the values of 1,500 and 500 and is probably close to 500 mg.min/m^3 for practical purposes.

6. Therefore, as a suggested definition, it is possible to state that: a chemical compound or element can be considered as a potential agent of war if it has a median incapacitating or irritating dosage of less than 500 mg.min/m^3.

Use of agent definitions in establishing scope of prohibition

7. Thresholds have been suggested which separate those chemical substances which have military potential based on their effectiveness to incapacitate or irritate from those that do not have such a potential. (Some of the chemical substances thus defined as being potential agents of war also have recognized peaceful uses.)

2/ Non-lethal agents are discussed in the Report of the Secretary-General of the United Nations on Chemical and Bacteriological Weapons (Document A/7575 or S/9292) where they are described in the broad category of incapacitating agents. (This working paper restricts the meaning to that given in the introduction in which the qualification, "for a significant period of time", is important.)

8. The non-lethal agents can be defined, according to the duration of their effects on exposed personnel, as being either irritating or incapacitating.

9. In the case of harassing or irritating agents which are widely recognized as essential for civil riot control because of their quick reaction and short duration without injury, it is unlikely that governments would be preared to ban their continued development, production and stockpiling. It might on the other hand be generally accepted that the development, production and stockpiling of incapacitating agents could be prohibited. This acceptance would stem from the unreliability and unpredictable effects of incapacitating agents, particularly the psychochemicals. It would seem unlikely that governments would wish to retain such agents for civil police use. In the event of there being a disposition to prohibit incapacitating agents but to allow irritating agents for civil use, an expert review committee could determine into which category fell those chemicals above the agreed threshold of effectiveness.

TABLE I

Classification of some chemical compounds and elements based on toxicity including sub-groups based on purpose

Lethal Agents	Lct50 *	mg.min/m^3
Supertoxic (single purpose)	VX	10-50
	Sarin	100
	Soman	50-100
	Tabun	400

UPPER THRESHOLD

Mustard 1,500
Lewisite 1,500

Toxic

Araine 5,000

3,200 Phosgene Toxic
5,000 HCN

SINGLE PURPOSE
DUAL PURPOSE
**

(CN 11,000)

11,000 Cyanogen Chloride

(Adamsite 15,000)

19,000 Chlorine

LOWER THRESHOLD

All other chemicals that have no significant military value

* Dosage vapour concentration multiplied by time of exposure lethal to 50 per cent of exposed personnel.

** Chemicals having both military and civil use.

TABLE II

Classification of some chemical compounds based on Irritiating and Incapacitating dosages

Non-lethal Agents

Irritating CT50 **	mg.min/m^3	Incapacitating Ct50 **
CS 10-20		
Arsine Derivatives 10-30		
CN 80		
		BZ > 200
	THRESHOLD	

Effectiveness of chemicals in this range not of military interest

** Dosage vapour concentration multiplied by time of exposure Irritating or Incapacitating to 50 per cent of exposed personnel.